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# Technical report

# Prevention of head injuries: A priority for World Health Organization

Every year, more and more people around the world are taking to the road. It is an undisputed sign of the times. The car ist the preferred mode of transport of the latter half of the century. Should traffic flow stop for a day, modern life would come to a standstill. But driving a motor vehicle is far from being a risk-free occupation. Irrefutable statistics from the United States of America (USA) and the twelve countries of the European Economic Community (EEC) show that, each year, about 100000 people die on the roads in these countries, and road accidents leave several hundred thousand more with permanent disabilities.

Unfortunately, accidents can happen anywhere. According to the World Health Organization (WHO), injuries are the cause of more than 3 million deaths in the world each year (3172000 in 1985), amounting to 6.5% of overall mortality. This mortality is roughly twice as high for men as for women, and on average nearly half of all deaths among young men are caused by injuries. The morbidity resulting from injury is even more alarming. In the USA, for example, some 60 million medical interventions are needed for treatment, and these in turn give rise to 150000 days of hospitalization a year to the tune of US $160000 million in 1985. As if the United States' annual death toll on the roads of 50000 was not bad enough, there are nearly 80000 people who suffer permanent disability as a result of head and spinal cord injuries, and an average 2000 cases a year of coma and prolonged or indefinite dependence on medical life support systems. Alcohol is an important cause of road accidents, and 40% of all people in the USA are involved in an alcohol-related motor vehicle collision some time during their lives. In the Netherlands, injuries on the roads, in the workplace, in the home or in the course of recreational activities result in some 4000 deaths and also give rise to nearly 100000 hospital admissions a year.

Statisticians classify all types of accident under the heading "violent death", together with suicide, homicides, even injuries resulting from military conflicts. The steady increase in accidents has now become a matter of major public health concern. With only a few exceptions, the figures are substantially underestimated.

In the Americas, violence is the leading cause of death in the 15–45 year age group. Violence seems to be becoming a universal phenomenon occurring on all continents, in both industrialized and developing countries. For example, homicides and road accidents are the leading cause of overall mortality in Thailand, while in Venezuela they rank as the second-highest cause of death.

## Prevention: A new approach

New measures of prevention have become urgently necessary, and some have already been introduced. These interventions are based on a scientific approach. Injuries are no longer regarded as accidental events that are due to chance and thus beyond any from of control; there are epidemiological patterns of injuries and mechanisms which can be addressed by preventive activities in the same way as more conventional types of disease. This is not to negate individual responsibility and factors related to human behaviour, but rather it attaches greater weight to other factors. It is recognized that injury is the result of the interplay of several factors, whose respective influence is often difficult to assess correctly. The prevention of injuries from road accidents must take into account a number of seemingly unrelated elements: human (road users' behaviour), mechanical (the quality of vehicle construction and speed), and circumstantial (the state of the roads, signs and signals). Traffic regulations – speed limits, laws concerning drink-driving and the wearing of seat belts – have also proved to be determining factors in road safety.

Efforts to prevent injuries have concentrated mainly on three major areas: occupational safety, road safety and safety in the home, including sports and recreational activities. Each of these three major areas has its own particularity in terms of the statistics available and the approaches and interventions that are advocated.

The figures that are available relate mainly to mortality and come from the civil registry statistics that are transmitted to WHO. However, it is not always easy to distinguish between deaths at work and deaths that occur in the home and in the course of recreational activities. It is road accident deaths that are most accurately reflected in this source of data. The distribution of 100 deaths from unintentional injury can be estimated as follows: motor vehicle accidents (50%); occupational accidents (10%); domestic, sports and recreational accidents (40%). Injury can also lead to morbidity. Data on morbidity are difficult to obtain and are usually based on specific recording systems, such as the HASS (Home Accident Surveillance System) in the United Kingdom, NOMESCO (the injury classification system developed by the Nordic Medico-

Statistical Committee) or EHLASS (European Home and Leisure Accident Surveillance System) in the EEC.

## Head injuries: A priority

WHO has highlighted the prevention of head injuries, which account for nearly 50% of all injuries, be they at work, at home, on the road or in recreation. The Organization believes that preventative measures, such as seat belts, inflatable air bags, and the use of crash helmets by road users and sportsmen, as well as by miners and contruction workers, will greatly reduce serious head injuries.
Mortality from head injuries is estimated at about 10 per 100000 people, and hospital morbidity at about 300 per 100000 people. The mean age of death from head injury is 44 years (40 for men and 52 for women), which represents a mean loss of 28 years of life for each person. For the sake of perspective, the mean age of death from cancer is 69 years, as compared with 72 years for heart diseases and ischaemia and 77 years for cerebrovascular diseases. The external causes of head injuries in the United Kingdom are road accidents 41%, injuries in the home 21% (including falls and assault), outside the home 23%, sports 9% and work-related 6%.
Data from the United States paint an even more startling picture of the extent of the problem – more Americans have died from head injury in the last 12 years than in all the wars in which the country has been involved since its foundation. The main causes of head injury in the United States, mostly involving the young, are motor vehicle accidents (35–50%), falls (20–30%), assault and other acts of violence (10–15%) and the practice of sports and other recreational activities (10%). The national bill for such injuries runs at around US $25000 million a year. In the EEC, head trauma is the first cause of death among the 50000 annual road fatalities. Each year, *all* incidents involving head trauma require one million hospitalizations, and result in 10000 new cases of disability, including epilepsy, psychological damage, and loss of vision or locomotion, to name just a few. Three quarters of such cases involve children or young adults.

## The means of protection

The good news for the road user is that seat belts do work. Consider the evidence. Between 1983–1989 the use of safety belts in the USA has been estimated to save 20086 lives and prevented about 523100 injuries. During this period, the use of seat belts reduced the occurrence of death and severe injury by an average 40%. Studies based on hospital admissions have shown that a person in the front of a vehicle not wearing a seat belt was five times more likely to sustain a serious head injury than if the seat belt was worn. Front-seat passengers wearing their seat belts suffered 69% fewer skull fractures, 58% fewer facial fractures and 82% fewer eye injuries. The efficacy of seat belts is now beyond doubt and many countries have made their use compulsory by law. In some countries, such as Canada, France and the United Kingdom, this requirement has recently been extended to passengers in the back seats. The degree of road safety is directly linked to existing speed limits, drink-driving laws, regulations governing the issue of driving licences, and improvements in vehicle and road construction. Inflatable cushions are another form of passive protection for travellers in motor vehicles. Although they are effective, particularly associated with seat belts in frontal collisions, they are not yet widely available and their use needs to be encouraged.
Legislation requiring helmet wearing for motor cyclists has been shown to reduce by about 30% death and serious injuries when an accident occurs. Likewise, in spite of their efficacy, crash helmets are not yet widely used by cyclists (less than 10%) and have been resisted on the grounds of cost, discomfort and sheer ignorance of their benefits. Between 1983 and 1990, education and publicity campaigns in the State of Victoria, Australia, produced a significant increase in the use of crash helmets, with numbers rising from 5–75% among primary school children and from 2–25% among secondary school children. The authorities were then able to introduce a law making the wearing of crash helmets compulsory for cyclists, with the very positive result that head injuries fell by 66% in cyclists under the age of 15.
In the industrialized countries, the incidence of sports traumas and injuries is exceptionally high, but there are ways of reducing the risk. Studies have shown that the wearing of helmets for high-speed and high-energy sports, such as boxing, car racing, parachuting, riding, ice hockey, skating and skateboarding, would considerably reduce the number of severe head injuries.

## The role of WHO

Faced with this worldwide problem, WHO aims to establish information systems that will facilitate accurate data collection related to head injuries. "SAFECOM" is the name given to the network of demonstration programmes on community safety which the WHO Programme on Accident and Injury Prevention has established in Denmark, France, Indonesia, Malaysia, Sweden, Thailand, and Venezuela. Research on the treatment and rehabilitation of injury victims is also perceived as a priority. WHO's collaborating centres participating

in this project have developed strategies for global action to promote effective protection measures. In addition, cooperation with nongovernmental organizations will be strengthened in view of their fundamental role in social support, particularly with the European Brain Injury Society presently involved in research work under the aegis of the EEC. The results of these scientific activities and the campaign for the use of crash helmets and seat belts will be evaluated after two years. The findings are to be presented at the World Conference on Injury Control, to be held in Atlanta, USA, in May 1993, organized by the Centers for Disease Control at Atlanta, and co-sponsored by WHO and its network of collaborating centres.

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